

MATH 250/GRACEY
 QUIZ 1/UNIT CIRCLE
 20 POINTS POSSIBLE
 NO CALCULATOR!!!

NAME Key

1. (1 POINT) Find the exact value of the expression $\sin^2\left(\frac{5\pi}{3}\right) + \cos^2\left(\frac{5\pi}{3}\right)$.

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2. (12 POINTS) Find the EXACT value(s) of t in the interval $[0, 2\pi)$ that has the given circular function value.

a. $\cos t = -\frac{1}{2}$

$t = \left[\frac{2\pi}{3}, \frac{4\pi}{3}\right]$

b. $\sec t = -\frac{2\sqrt{3}}{3} = -\frac{2}{\sqrt{3}}$

$t = \left[\frac{5\pi}{6}, \frac{7\pi}{6}\right]$

c. $\cot t$ is undefined.

$t = [0, \pi]$

$\cot t = \frac{\cos t}{\sin t}$

d. $\tan t = 1$

$t = \left[\frac{\pi}{4}, \frac{5\pi}{4}\right]$

e. $\csc t = -\sqrt{2}$

$t = \left[\frac{5\pi}{4}, \frac{7\pi}{4}\right]$

f. $\sin t = \frac{1}{2}$

$t = \left[\frac{\pi}{6}, \frac{5\pi}{6}\right]$

3. (1 POINT) Through how many radians will the second hand of a clock rotate in 6 hours?

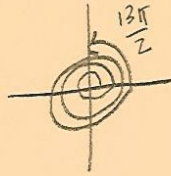
$1 \text{ rev} \times \frac{2\pi}{1 \text{ rev}} = 2\pi \text{ radians per min}$

$6 \text{ hrs} \times \frac{60 \text{ min}}{1 \text{ hr}} = 360 \text{ min in 6 hrs}$

so $(2\pi)(360) = 720\pi$ radians

4. (6 POINTS) Evaluate the EXACT value of the following trigonometric expressions.

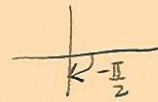
a. $\cos \frac{13\pi}{2} = \boxed{0}$



$\frac{13\pi}{2}$ is coterminal with $\frac{\pi}{2}$

b. $\sin \frac{11\pi}{6} = \boxed{-\frac{1}{2}}$

c. $\tan\left(-\frac{\pi}{2}\right) = \boxed{\text{undefined}}$



d. $\sec 0 = \boxed{1}$

e. $\csc \frac{2\pi}{3} = \boxed{\frac{2}{\sqrt{3}} \text{ or } \frac{2\sqrt{3}}{3}}$

f. $\cot \frac{2001\pi}{2} = \cot \frac{\pi}{2} = \boxed{0}$

$$\begin{aligned} \frac{2001\pi}{2} &= \frac{2000\pi}{2} + \frac{1\pi}{2} = 0 + \frac{\pi}{2} = \frac{\pi}{2} \\ &\downarrow \\ &1000\pi \\ &\downarrow \\ &\text{coterminal with } 0 \end{aligned}$$